

# INFORMATION REPORT

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## REPORT

DATE DISTR. 9 November 1953

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## REFERENCES

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SECURITY INFORMATION

REPORT

COUNTRY : ~~East Germany~~

DATE DISTR. 6 OCT 53

SUBJECT : Development of Rudder Drives and Exhaust  
Heating Systems for Large Dredger at  
Rosslau Shipyard.

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PLACE  
ACQUIREDNO. OF ENCL'S  
(LISTED BELOW) 50X1-HUMDATE  
ACQUIREDSUPPLEMENT TO  
REPORT NO.

DATE OF II

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THIS IS UNEVALUATED INFORMATION

1. work at Rosslau Shipyard

included designing and development of a rudder drive for a large dredger, an exhaust heating system for a large dredger, a main shaft for a salvage tug, and stem tubes for sectional ship construction.

2. The dredger has a double rudder necessitating two rudder drivers. Each drive is operated by a synchronized electric motor working through a reduction gear [see page 3].

3. The electric motor is connected to an elastic coupling which leads into a double cog-wheel reduction gear (1-1:2 (twice), thus 1 of the reduction gear is 4). This in turn is connected to a worm reduction gear, 1-1:30. The worm is firmly held to the shaft with a pinion. The worm is removable so that an auxiliary helm may be used for steering. (Were the worm not removable, it would block the steering mechanism.) The ratio between worm and quadrant is 1-1:10. The total reduction down to the quadrant is thus  $2 \times 2 \times 30 \times 10 = 1200$ . The actual 1 of 1250 is obtained by use of an odd number of teeth to avoid constant meshing of the same teeth. All wheels down to the worm have ball bearings and are in oil-filled casings. The worm and quadrant have

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friction bearings and are also in oil-filled casings. The electric motor does approximately 750 rpm. i.e., during one minute, the rudder is turned 0.6 rpm. In other words, approximately 30 seconds are necessary to effect a 90 degree rudder deflection (from full port to full starboard). This corresponds to the Germanische Lloyd (GL) stipulations. The electric motor has an output of approximately 0.5 kilowatts and produces a torque of roughly 850 meter kilograms at the rudder. During ordinary cruising such high torque would not be required; it is meant more as a reserve (when running aground or during high seas).

#### Exhaust Heating of the Dredger

4. The dredger has two different heating systems:

- a. conventional boiler heating, and
- b. exhaust heating

5. Concerning the exhaust heating system, the dredger has two main engines, one of which can be connected to the exhaust heating at a time. The exhaust gases are collected in a manifold and led either to the heat exchanger or into the open [see page 5].

#### Line Shaft for Deep-Sea Salvage Tugboats

6. An 18 meter shaft was designed and computed in accordance with the stipulations of the Germanische Lloyd (GL) for a salvage tug. Innovations were not taken into consideration, in other words, designs were based on existing drawings. The strength of the shaft was calculated for travel through ice.

#### Stem Tubes

7. Two types of tubes were designed for single screw vessels and one type for a twin-screw ship [see page 6].

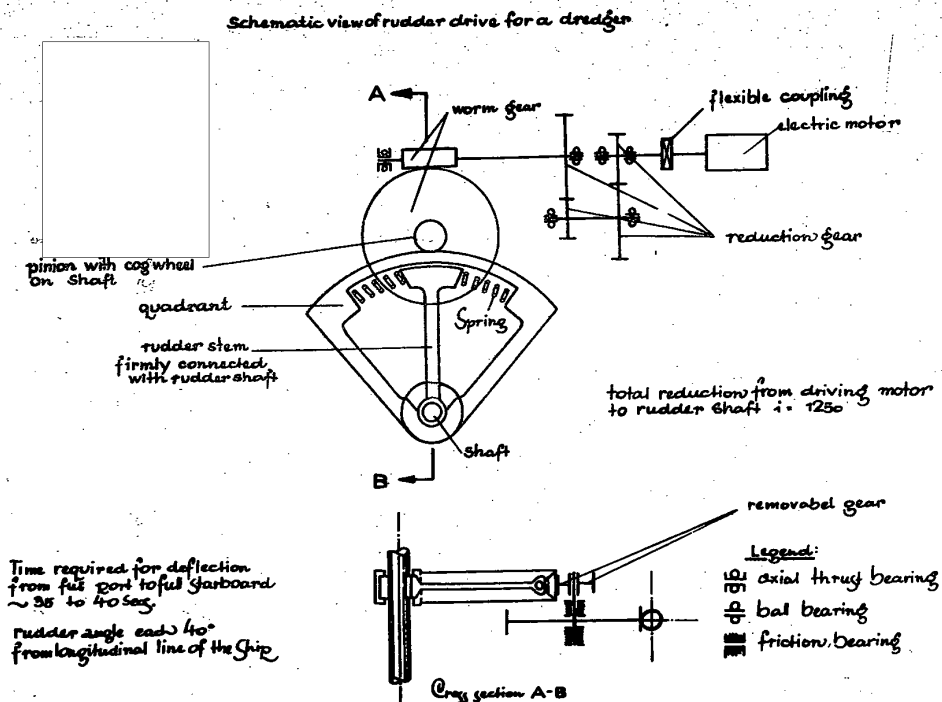
Comments: Both the rudder and exhaust heating systems were designed for a large dredger especially suited for dredging in the Baltic Sea. The draught was 12 to 14 feet, and the dredger had twin screws driven by diesel-electric motors in order to avoid long shafts.]

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RUDDER DRIVE SYSTEM



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**LEGEND TO EXHAUST HEATING SYSTEM** [see page 5]

1. Diesel motors
2. Exhaust manifolds
3. Exhaust deflector (the deflector is operated manually)
- 3a. One pipe from the deflector leads into the open
4. Y-pipe
5. Heat exchanger (exhaust heater)
6. Exhaust into the open

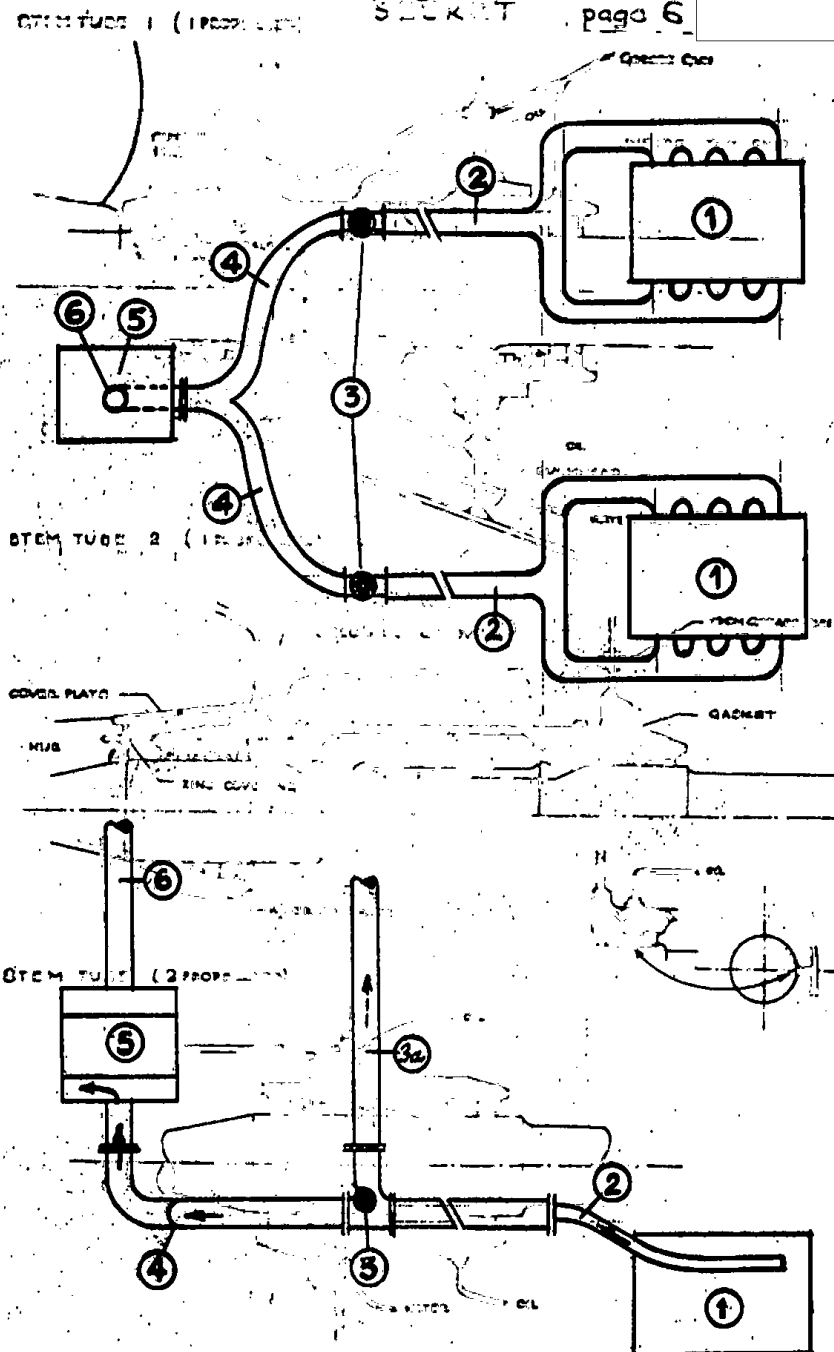
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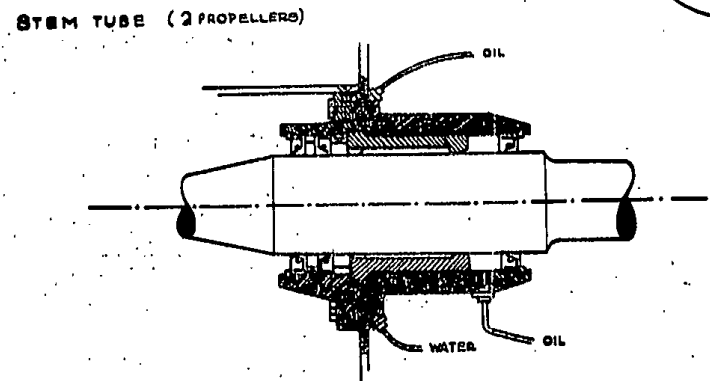
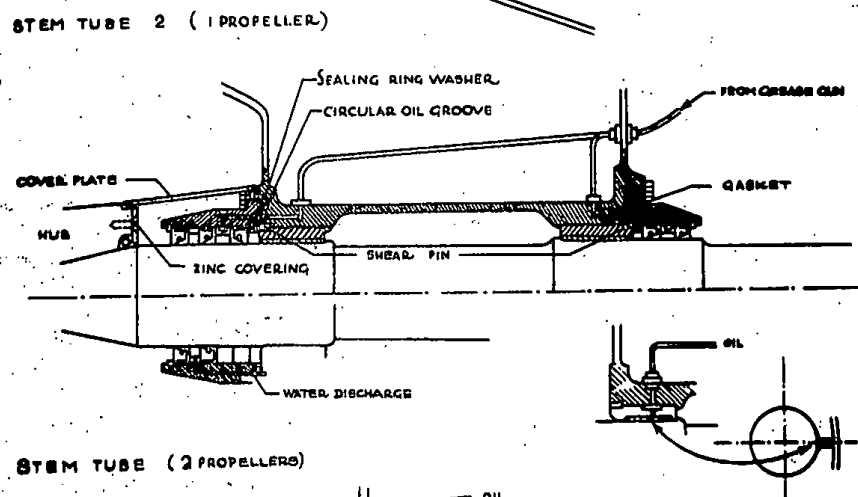
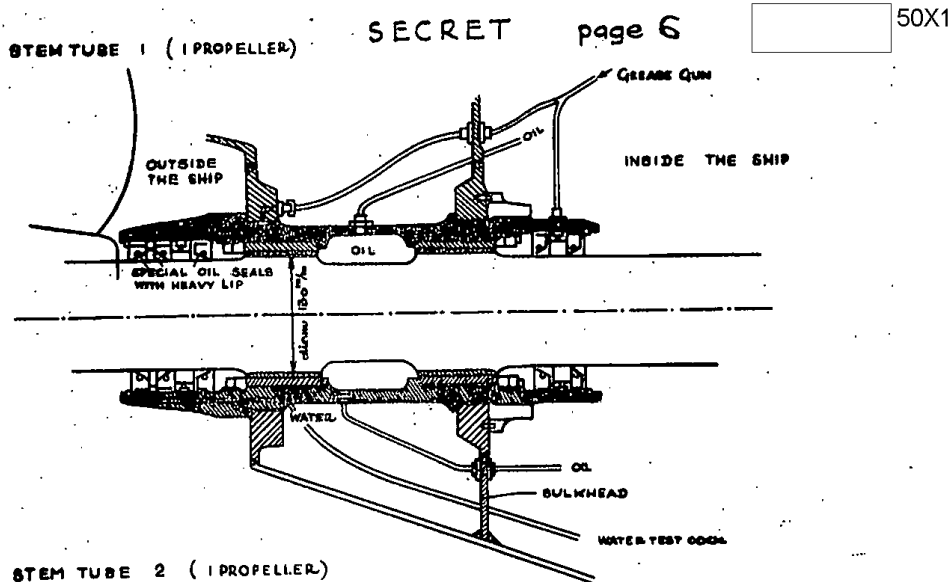
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Drawings of STEM TUBES for  
Section A. Construction

## EXHAUST HEATING SYSTEM

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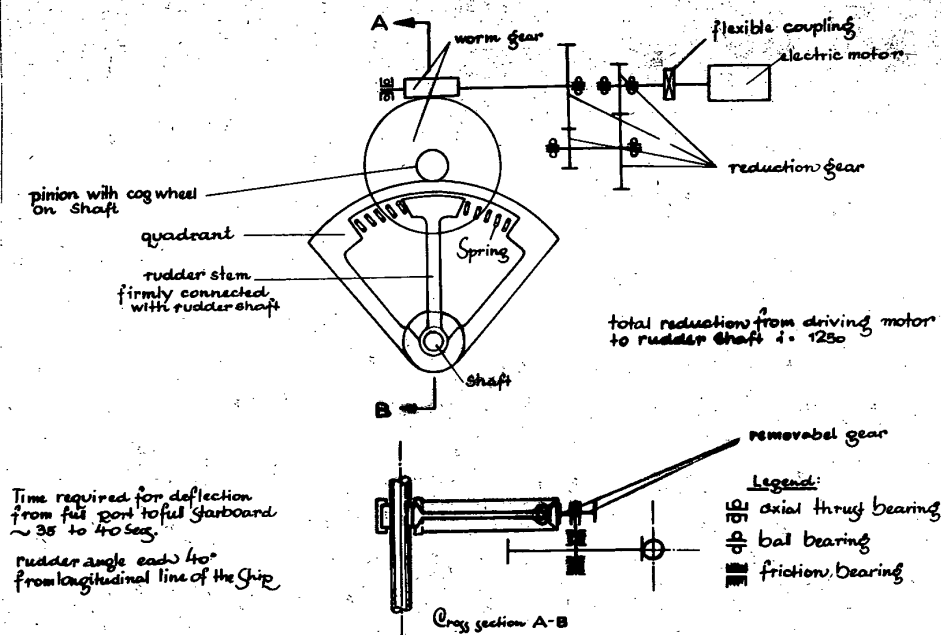
Drawings of STEM TUBES for  
Sectional Construction

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RUDDER DRIVE SYSTEM

Schematic view of rudder drive for a dredger



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